Rhodora

JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

Vol. 12. October, 1910. No. 142.

NOTES ON NEW ENGLAND HEPATICAE,— VIII.

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The additions made to the hepatic flora of New England during the past year include two *Ricciaceae*, the rare *Lophozia Kaurini*, and two species of *Frullania*. All of these are discussed in the present paper. Another species, *Pedinophyllum interruptum*, although found in New England by Oakes many years ago and cited by Austin and Underwood, is here recorded for the first time from a definite New England locality. Attention is also called to three species of *Lophozia* which are variously interpreted by authors, and a number of additions to local state floras are mentioned at the close of the paper.

1. Riccia sorocarpa Bisch. Nova Acta Caes. Leop.-Carol. **17**: 1053. *pl. 71, f. II.* 1835. *R. minima* L. Sp. Plant. 1139. 1753 (in part). *R. Lindenbergiana* Sauter, Flora **28**: 132. 1845. *R. epicarpa* Wallr.; G. L. & N. Syn. Hep. 600. 1846. *R. Raddiana* Jack & Levier; Stephani, Bull. de l'Herb. Boissier **6**: 336. 1898. On sandy soil, sometimes among rocks. Connecticut: Plainfield (*J. L. Sheldon*, 1908); New Haven and New Milford (*G. E. Nichols*); Brookfield (*A. W. E.*). The occurrence of *R. sorocarpa* in Connecticut has already been recorded by Sheldon.[1] In all probability its range extends throughout New England, although no stations, other than those noted, are known at the present time. According to Underwood[2] the species has been found in New York, New Jersey, South Carolina, Illinois, and California, while C. Jensen[3] reports it

[1] Bryologist **13**: 64. 1910.
[2] Bot. Gaz. **19**: 278. 1894.
[3] Meddel. om Grønland **15**: 369. 1898.

from Greenland. It is also widely distributed in Europe and Asia, especially in the north.

The plants as a rule do not form rosettes but branch only once or twice and are irregularly scattered over the substratum. The branches of the thallus are usually from 3 to 4 mm. long and from 0.5 to 1 mm. wide and taper toward the apex. The upper surface is grayish green, sometimes tinged with reddish, and shows a narrow median groove in the apical region. In the older parts of the thallus the groove becomes more or less flattened out. The postical scales are colorless and inconspicuous, and there are no marginal hairs. In transverse section the thallus is a little broader than thick, and its sides are almost vertical, although they flare somewhat above and thus form an acute angle with the upper edge.

The photosynthetic tissue, as is characteristic for the entire genus, consists of cells in vertical rows separated by narrow air-canals. In sections cut near the apex the uppermost cell of each row is thin-walled and strongly inflated. Soon, however, the lower part of the wall becomes thickened and the thin upper part disappears. In this way there is nothing left of the cell except a shallow cup-shaped portion, which appears U-shaped in section. The cells below these uppermost cells soon acquire thick walls also, but here the thickening is more or less uniform throughout and the cells remain intact, assuming the function of an epidermis. In some cases, especially toward the edge of the thallus, the thickening affects three or four cells of a row, so that the functional epidermis may be two or even three cells thick. The thick-walled cells are usually colorless and stand in marked contrast to the green cells below them. The peculiarities just noted were first adequately described by Heeg [1] and are clearly shown in a figure recently published by Müller.[2] They yield some of the most distinctive characters of the species.

The capsules of *R. sorocarpa* are irregularly scattered in the thallus. The mature spores measure 70–95 μ in diameter and are dark brown. The convex faces of the spores are finely and regularly reticulate, the ridges bounding the meshes being about 4 μ high. The three triangular faces commonly show irregular and minute thickenings but may be almost smooth. At the junction between the convex

[1] Bot. Not. 1898: 19.

[2] Rabenhorst's Kryptogamen-Flora **6**: 145. *f. 101d.* 1907.

face and the triangular faces a narrow pale brown wing is developed, the margin of which is minutely and irregularly crenulate.

As shown by the synonymy *R. sorocarpa* is one of the component parts of *R. minima* L. The Linnaean species was based on three non-binomial species published prior to 1753. The first of these was Riccia frondibus glabris bipartitis acutis L. (Fl. Suec. 341. 1745); the second, Riccia minima, nitida, segmentis angustioribus, acutis Mich. (Nov. Plant. Gen. 107. *pl. 57, f. 6.* 1729); the third, Lichen omnium minimus, foliolis scissis, super terram expansis Dill. (Hist. Musc. 534. *pl. 78, f. 11.* 1741). If reference is made to the Flora Suecica it will be found that Linnaeus first described his non-binomial species in 1741 (Kongl. Svenska Vetensk. Acad. Handl. Stockholm **2**: 209), the same year in which Dillenius published his Historia Muscorum. In both places Linnaeus quotes Micheli's plant as a synonym, while the Dillenian species, as would naturally be expected, first appears as a synonym in the Flora Suecica. In the absence of a Linnaean type for *R. minima*, it becomes necessary to interpret the species from the descriptions, figures, and specimens of Micheli and Dillenius. Levier [1] has clearly shown that Micheli's species is what is now known as *R. nigrella* DC., while Lindberg [2] has proved the identity of the Dillenian species with *R. sorocarpa* Bisch. The question at once arises, for which of these two distinct species should the name *R. minima* be retained? The application of either the Vienna Rules for Nomenclature or the American Code would indicate *R. nigrella*, in spite of the fact that Lindberg and Arnell,[3] Schiffner,[4] and Howe [5] have decided in favor of *R. sorocarpa*. Possibly their decision was based on the fact that the only stations mentioned by Linnaeus under his non-binomial species are in Sweden, where *R. nigrella* has not yet been discovered. It should be remembered, however, that the two early works in which the species is referred to were devoted to the flora of Sweden, and that Linnaeus certainly implied a much more extensive distribution for his plant by quoting the species of Micheli and Dillenius. In the Species Plantarum he describes the habitat as "Europe," without citing definite localities. Levier, who has treated the question at considerable length, wisely

[1] Rev. Bryol. **20**: 101–105. 1893.
[2] Acta Soc. Sci. Fenn. **10**: 471. 1875.
[3] Kongl. Svenska Vetensk.-Akad. Handl. **23**[5]: 14. 1889.
[4] Engler & Prantl, Nat. Pflanzenfam. **1**[3]: 15. 1893.
[5] Mem. Torrey Club **7**: 23. 1899.

suggests that the name *R. minima* be given up altogether and that both *R. nigrella* and *R. sorocarpa* be known by the names under which they were first clearly distinguished.

2. **Ricciella membranacea** (Gottsche & Lindenb.) comb. nov. *Riccia membranacea* Gottsche & Lindenb.; G. L. & N. Syn. Hep. 608. 1846. *Riccia tenuis* Aust. Proc. Acad. Philadelphia for 1869: 233. In a dried up ditch. Hartford, Connecticut (*E. B. Harger* and *Miss Lorenz*). New to New England. The type locality of *R. membranacea* is in Mexico, while that of *Riccia tenuis* is in New Jersey. The latter species was considered distinct until Stephani [1] reduced it to synonymy in his Species Hepaticarum. According to Underwood [2] it occurs in New Jersey, Delaware, Ohio, Missouri, and Arkansas. The writer has found it also near Cayey, Porto Rico, and the specimens from this locality agree closely with those from Hartford. If Spruce's *Riccia lanigera*,[3] as Stephani asserts, is likewise to be considered a synonym of *R. membranacea*, then the range of the species extends well into South America. Spruce's description, unfortunately, disagrees in several important respects, so that the identity of the two species cannot yet be regarded as thoroughly established.

The plants of *R. membranacea* bear considerable resemblance to the prothallia of ferns. They grow closely appressed to the ground, sometimes scattered, sometimes more or less crowded and forming irregular mats or patches. They are dark green but often appear somewhat paler on account of the air in the large intercellular spaces described below. The thallus is broad and thin, practically plane on the upper surface, and usually forks only once or twice. It measures from 3 to 5 mm. in length, and the broad divisions, which are truncate and narrowly indented at the apex, are 2 to 3 mm. wide. The texture of the thallus is exceedingly delicate, and the central region, except where the sporophytes are situated, is rarely more than 0.3 mm. thick. From this central region the wings gradually thin out toward the edge, which is bordered by a margin about three cells wide and only one cell thick. Even in the median part of the thallus the solid basal tissue is only a few cells thick and quickly becomes reduced to a single layer in the wings. The bulk of the thallus is made up of a loose photosynthetic tissue in which the air spaces are

[1] Bull. de l'Herb. Boissier **6**: 361. 1898.
[2] Bot. Gaz. **19**: 278. 1894.
[3] Hep. Amaz. et And. 570. 1885

large and irregular. In most cases they are arranged in only one or two layers. They are separated from one another by thin plates of green cells and are bounded above by an epidermis one cell thick composed of similar cells. The outlines of the air spaces can often be seen clearly through the epidermis, and some of them at least communicate with the outside air by means of irregular pores. Postical scales could not be demonstrated in the material studied, although Austin [1] states that they sometimes occur.

The mature capsules of *R. membranacea* are irregularly scattered in the thallus and bulge out from the lower surface. They attain a diameter of 0.3–0.45 mm. The spores are oval and dark brown, measuring about 40 μ in length. The surface is thickly covered over with short blunt spines, 2–3 μ long, and these are especially numerous on the convex face. The three triangular faces are indistinct at maturity, and there is no wing developed at their junction with the convex face.

Among the New England species of *Ricciella*, *R. crystallina* (L.) Warnst. seems to be the closest ally of the present species. *R. crystallina*, however, is considerably larger, and the epidermis, which is at first continuous over the large intercellular spaces, eventually breaks down more or less completely and leaves the photosynthetic tissue directly exposed to the air. The upper surface of the thallus thus acquires a peculiar spongy appearance. The spores of *R. crystallina* are likewise very different. They are much larger, usually 70–80 μ in diameter, the surface is reticulate, and a delicate wing is developed where the triangular faces meet the convex face.

3. Lophozia badensis (Gottsche) Schiffn. Lotos **51**: [7]. 1903. *Jungermannia acuta* Lindenb. Nova Acta Caes. Leop.-Carol. **14**, suppl.: 88. 1829 (in part). *J. badensis* Gottsche; Rabenhorst, Hep. Europ. *95*. 1859. On damp limestone rocks. Hartford, Vermont (*Miss Lorenz*). Salisbury, Connecticut (*A. W. E.*). The discovery of *L. badensis* in Quebec has recently been noted by the writer.[2] During the past summer Miss Lorenz found the species in Vermont, as above recorded, and pointed out the fact that the specimens from Salisbury, Connecticut, which were reported a few years ago as *L. Muelleri* (Nees) Dumort.,[3] also agreed better with *L. badensis*

[1] Hep. Bor.-Amer. *150*. 1873.
[2] Bryologist **13**: 34. 1910.
[3] See Evans, Rhodora **8**: 35. 1906.

and should be referred to the latter species. *L. badensis* has likewise been collected near Ithaca, New York, by A. LeRoy Andrews and probably has an extensive range in North America. The relationship between *L. Muelleri* and *L. badensis* is so close that many European writers have regarded them as forms of a single variable species. At the present time, however, there is a strong tendency to consider them distinct. In both species the inflorescence is dioicous, the leaves are bifid with usually pointed lobes, the leaf-cells have trigones and a striolate cuticle, and the perianth is terete and abruptly contracted into a tubular beak. In *L. badensis*, however, the plants are smaller than in *L. Muelleri*, the leaf-cells are a little larger, and the trigones are less developed. There are also important differences in the underleaves. In *L. badensis* these are usually absent altogether and even when they are present they are minute and often evanescent. In *L. Muelleri*, on the contrary, they are uniformly present and persistent.

4. Lophozia Kaurini (Limpr.) Steph. Bull. de l'Herb. Boissier II. **1**: 1147. 1901. *Jungermannia Kaurini* Limpr. Jahresb. Schles. Gesell. Vaterl. Cultur **61**: 204. 1884. On damp limestone rocks. Quechee Gulf, Hartford, Vermont (*Miss Lorenz*). The determination of the specimens was made by Miss Lorenz. This is the second known station for North America, the first being Hunker Creek, Yukon Territory, where the species was discovered by J. Macoun.[1] In Europe it is also rare but is now known from a number of localities in Norway, Sweden, Finland, Switzerland, and Italy. Its range likewise extends into Siberia, where it was found by Arnell. In *L. Kaurini* the leaves are bifid, the leaf-cells have conspicuous trigones and a strongly verruculose cuticle, underleaves are uniformly present, the perigonial bracts develop a small antical lobe, and the terete perianth is abruptly contracted into a tubular beak with a ciliate mouth. All of these peculiarities show a close relationship to *L. Muelleri*, with which *L. Kaurini* has been more or less confused. It may be at once distinguished, however, by its paroicous inflorescence, *L. Muelleri* being dioicous. In *L. Rutheana* (Limpr.) M. A. Howe, another close ally which is perhaps to be expected in New England, the inflorescence is also paroicous. Fortunately there is little danger of confusing the two species because *L. Rutheana* is

[1] Ottawa Nat. **17**: 20. 1903.

much more robust and is frequently tinged with purplish or reddish, *L. Kaurini* being green. *L. Rutheana* is further distinguished by larger and more complex underleaves and by the fact that it grows in swamps rather than on rocks.

5. Lophozia marchica (Nees) Steph. Bull. de l'Herb. Boissier II. **2**: 48. 1902. *Jungermannia marchica* Nees, Naturgeschichte der europ. Lebermoose **2**: 77. 1836. *J. laxa* Lindb. Acta Soc. Sc. Fenn. **10**: 529. 1875. In Sphagnum bogs. Maine: Beech Mountain, Mt. Desert (*E. L. Rand*); near Schoodic Lake (*A. W. E.*). New Hampshire: Waterville (*Miss Lorenz*). This rare species is widely distributed in northern Europe and is also known, in North America, from Ellesmere Land and from New Jersey. In all probability its range extends throughout New England.

6. Lophozia Mildeana (Gottsche) Schiffn. Lotos **51**: [54]. 1903. *Jungermannia Mildeana* Gottsche, Verhandl. der k. k. zool.-botan. Gesellsch. in Wien **17**: 626. *pl. 16.* 1867. *J. Novae-Caesareae* Evans, Bull. Torrey Club **20**: 308. *pl. 163.* 1893. *Lophozia Novae-Caesareae* Steph. Bull. de l'Herb. Boissier II. **2**: 161. 1902. In sandy swamps, sometimes among Sphagnum. Maine: Biddeford Pool (*Miss Lorenz*). New Hampshire: Franconia Mountains (*Miss Haynes, etc.*); Waterville (*Miss Lorenz*). Vermont: Jericho (*A. W. E.*). Massachusetts: Woods Hole (*A. W. E.*). Connecticut: East Haven, Huntington, and Orange (*A. W. E.*); Milford (*Miss Lorenz*).[1] The species is also known in North America from New Jersey, Delaware, and West Virginia and has an extensive range in Europe.

In the writer's first series of Notes on New England Hepaticae,[2] *L. Mildeana* was included under *L. marchica* as a synonym, thus following the example of Stephani in his Species Hepaticarum. Since that time Warnstorf,[3] Schiffner, and Müller,[4] although recognizing the close relationship between the two plants, have maintained the validity of *L. Mildeana* as a species. The same course is followed in the present paper. In the majority of cases the two plants can be distinguished at a glance. In *L. marchica* the plants are commonly scattered among tufts of Sphagnum, the stems are more or less pig-

[1] Most of these stations have already been reported under *L. marchica.*
[2] Rhodora **4**: 207–213. 1902.
[3] Kryptogamenfl. der Mark Brandenburg **1**: 200. 1903.
[4] Rabenhorst's Kryptogamen-Flora **6**: 699. 1910.

mented with purple, the leaves are distant and pale green, and the leaf-cells are thin-walled throughout. In *L. Mildeana*, on the other hand, the plants are often tufted and grow on moist sandy soil as well as among Sphagnum, the stems are pale green, the leaves are frequently crowded and pigmented with purple, and the leaf-cells, especially in exposed localities, have their walls more or less thickened. In gemmiparous forms of *L. Mildeana* the stems are delicate and usually bear scattered leaves without any sign of pigmentation. Under such conditions the characters of the species are not clearly shown. There is little danger, however, of confusing such plants with *L. marchica* and a careful search will often show more typical plants in the near vicinity.

7. Pedinophyllum interruptum (Nees) Pearson, Hep. British Isles 269. *pl. 111.* 1900. *Jungermannia interrupta* Nees, Naturgeschichte der europ. Lebermoose **1**: 165. 1833. *Plagiochila interrupta* Dumort. Recueil d'Obs. sur les Jung. 15. 1835. *P. macrostoma* Sulliv. Musc. Alleg. *221.* 1846. *Plagiochila* (*Pedinophyllum*) *pyrenaica*, var. *interrupta* Lindb. Not. Soc. F. et Fl. Fenn. **13**: 367. 1874. *Pedinophyllum pyrenaicum*, var. *interruptum* Schiffn.; Engler & Prantl, Nat. Pflanzenfam. **1**[3]: 89. 1893. *Plagiochila* (*?*) *lobata* Kaalaas, Nyt Mag. f. Naturv. **33**: 274. 1893. New England, *W. Oakes.* On dolomite rocks in a ravine; Brookfield, Connecticut (*A. W. E.*). The distribution of *P. interruptum* in North America is very incompletely known. It has been reported from Greenland, Labrador, Ohio, and from a few localities in Canada. It has a wide range in Europe, and Stephani notes its occurrence in Japan.[1]

The genus *Pedinophyllum* is at present monotypic and was based by its author, Lindberg,[2] upon *Plagiochila pyrenaica* Spruce,[3] a species which is now considered to be a peculiar form or variety of *P. interrupta.* Many subsequent writers have denied the validity of the genus and have continued to include *P. interruptum* among the species of *Plagiochila.* Spruce,[4] to be sure, suggested that *Pedinophyllum* might be considered a distinct subgenus under *Plagiochila*, admitting that *P. interrupta* differed from typical *Plagiochilae* in several important respects. Stephani, however, does not grant it

[1] Bull. de l'Herb. Boissier **5**: 81. 1897.
[2] Acta Soc. Sc. Fenn. **10**: 504. 1875.
[3] Ann. & Mag. Nat. Hist. II. **4**: 105. 1849.
[4] Hep. Amaz. et And. 452. 1885.

even subgeneric rank. Among those who maintain the distinctness of the genus may be mentioned Pearson, Schiffner, and Müller. According to Schiffner [1] *Pedinophyllum* shows two important characters which necessitate its separation from *Plagiochila*, and these are the characters which Lindberg insisted upon when he first proposed the genus. They are, first, the general habit of the plants and, second, the inflorescence. In *Pedinophyllum* there is no distinction between rhizome and leafy shoot, both the stem and its branches being prostrate and frequently producing rhizoids; in *Plagiochila*, on the other hand, the plant consists of a creeping rhizome from which the leafy shoots, usually destitute of rhizoids, ascend. In *Pedinophyllum* the inflorescence is autoicous, whereas in all accepted species of *Plagiochila* it is dioicous. As a matter of fact, *Pedinophyllum* is more closely related to *Mylia* (*Leptoscyphus*) and *Chiloscyphus* than it is to *Plagiochila*. It differs from *Mylia* in the fact that the female inflorescence is borne on a short branch instead of on an elongated branch or the main stem; it differs from *Chiloscyphus* in the fact that the perianth is laterally compressed instead of being triquetrous. The relationships and differences are clearly brought out by Schiffner.

In the field *P. interruptum* bears a marked resemblance to *Chiloscyphus polyanthus* and *Ch. pallescens*. Fortunately, it is usually fertile, and the compressed perianth will at once distinguish it. The female branch, moreover, although short, is never quite so abbreviated as in *Chiloscyphus* and may bear several pairs of leaves. In the absence of perianths the minute underleaves and the trigones in the leaf-cells may serve to separate the *Pedinophyllum*, the underleaves in *Chiloscyphus* being much better developed and the leaf-cells (in the two species in question) being thin-walled throughout. The perigonial bracts in *P. interruptum* bear a small pouch or lobe at the antical base, agreeing closely in this respect with *Chiloscyphus*.

8. Frullania inflata Gottsche; G. L. & N. Syn. Hep. 424. 1845. Evans, Trans. Conn. Acad. **10**: 10. *pl. 3*. 1897. On trees and rocks. Brookfield, Connecticut (*A. W. E.*). New to New England. A note on the distribution of *F. inflata* was recently published by the writer,[2] and the specimens just reported were discovered soon afterwards. Those growing on trees were abundant, while those on rocks were very scanty. In both cases there was more or

[1] Ber. d. naturw.-med. Ver. in Innsbruck **31**: [53]. 1908.
[2] Bryologist **13**: 36. 1910.

less admixture with *F. eboracensis*. According to our present knowledge *F. inflata* is confined to the United States. Its range extends from Connecticut westward to Minnesota and southward to the District of Columbia, Mississippi and New Mexico. It strongly resembles *F. eboracensis* but differs in its autoicous inflorescence and in its leaf-cells, which have trigones but no intermediate thickenings. In *F. eboracensis* the inflorescence is dioicous and the leaf-cells have thickenings of both types, thus making the contours of the cell-cavities irregular.

9. Frullania saxicola Aust., Proc. Acad. Philadelphia for 1869: 225. On trap rocks. Woodbridge, Connecticut (*A. W. E.*). The present species was based on specimens collected by Austin near Closter, New Jersey. He afterwards found it near Little Falls in the same state and distributed specimens, presumably from these two localities, in Hep. Bor.-Amer. *104*. The only other specimens which he quoted were collected by Wright in Texas. The plants distributed by Austin are more or less mixed with the form of *F. eboracensis* which, as *F. virginica*, used to be considered a distinct species. When the writer revised the North American species of *Frullania*, thirteen years ago, the specimen of this number which he examined was practically pure *F. virginica*, and on this basis Austin's species was reduced to *F. virginica* as a synonym.[1] A recent study of the same number in another set, where the admixture is less, shows conclusively that this reduction was unwarranted and that *F. saxicola* should be again recognized as a distinct species. The rocks where the Woodbridge specimens grow are near the bottom of a talus slope and are more or less exposed to the sun. This locality and those quoted by Austin are the only ones that can be cited at the present time.

The relationships of *F. saxicola* are with *F. inflata* rather than with *F. eboracensis*, although all three belong to the subgenus *Trachycolea* of Spruce. It agrees with *F. inflata* in the following important characters: the leaf-lobes are rounded but not cordate at the antical base; the leaf-cells have trigones but no intermediate thickenings; the inflorescence is autoicous; the perianth is pluriplicate with uneven but not tuberculate keels. The lobules of the leaves are almost invariably explanate in *F. saxicola* and are in the form of small lanceo-

[1] Trans. Conn. Acad. **10**: 17. 1897.

late expansions, acute to obtuse at the apex and quite entire except for the small basal stylus. Explanate lobules also occur with considerable frequency in *F. inflata*, although many stems fail to produce them altogether. The most important distinction between *F. inflata* and *F. saxicola* is found in the beak of the perianth. In *F. inflata* the beak is short but plainly tubular, the mouth is entire, and the inner surface is perfectly smooth. In *F. saxicola* the beak is still shorter and often cup-shaped, the margin is setulose from cells which project in the form of rounded papillae, and similar papillae arise from the inner surface, thus blocking up the opening. An approach to the condition found in *F. saxicola* is shown by *F. Kunzei* and by the three other members of the subgenus *Diastoloba* which are known from the United States. In these species, however, the papillae are restricted to the mouth of the beak and the inner surface is perfectly smooth.

A new species very similar to *F. saxicola* was recently described by Schiffner [1] under the name *F. cleistostoma* Schiffn. & Wollny. This plant also grows on rocks and is known at present from only two localities, both of them in the Tirol. It shares with *F. saxicola* the important characters listed above in connection with *F. inflata*, and the beak of the perianth is papillate in precisely the same way. No specimens of *F. cleistostoma* have been seen by the writer, but two points of distinction have been made out from the study of the published description and figures. In *F. cleistostoma* the median leaf-cells measure 26–30 μ, and the involucral bracteole is bifid only one fourth; in *F. saxicola* the median leaf-cells measure only 18–23 μ, and the bracteole is usually bifid one third or more. Whether these differences are sufficient to separate the two plants is doubtful, but the comparison of specimens would probably bring to light other points of distinction.

The additions to local state floras not alluded to in the preceding pages are as follows: —

For Maine. *Diplophylleia apiculata;* Industry (*J. F. Collins*).

For New Hampshire. *Pellia Neesiana* and *Cephaloziella elachista;* Waterville (*Miss Lorenz*).[2]

[1] Oesterr. Bot. Zeitschr. **59**: 467–472. *f. 1–26.* 1909.

[2] Some of the records for *C. elachista* may have to be revised in the future. The New Hampshire plants, for example, agree closely with *Cephalozia striatula* C. Jens. (Rev. Bryol. **31**: 25. 1904), but the distinctions between this species and *C. elachista* are not yet definitely established.

For Vermont. *Metzgeria furcata;* Woodstock (*D. L. Dutton*). *Cephalozia connivens;* Brandon (*D. L. Dutton*). *Cephaloziella elachista;* Woodstock (*Miss Lorenz*). *Lophozia alpestris* and *Scapania dentata;* Rochester (*D. L. Dutton*).

For Massachusetts. *Metzgeria crassipilis;* Hammond Pond (*E. Faxon*).

For Rhode Island. *Porella pinnata;* Johnston (*J. F. Collins*). *Cephalozia fluitans;* Burrillville (*J. F. Collins*). The Rhode Island records for *Ricciella fluitans* and *Preissia quadrata* may also be marked with the sign "+".

For Connecticut. *Metzgeria furcata;* Woodbridge (*A. W. E.*). *Pellia Fabroniana;* Kent (*A. W. E.*). *Cephalozia pleniceps* and *Cephaloziella elachista;* Brookfield (*Miss Lorenz* and *A. W. E.*). *Anthoceros Macounii;* Hartford and Wethersfield (*Miss Lorenz*).

The census of New England Hepaticae now stands as follows: Total number of species recorded, 162; number recorded from Maine, 108; from New Hampshire, 123; from Vermont, 97; from Massachusetts, 86; from Rhode Island, 66; from Connecticut, 120; common to all six states, 44.

YALE UNIVERSITY.

TWO PLANTS NEW TO MASSACHUSETTS.

ARTHUR J. EAMES.

POTAMOGETON HYBRIDUS Michx., var. MULTI-DENTICULATUS (Morong) Asch. & Graebner.— This plant is of coastal plain distribution, and, according to the last edition of Gray's Manual, has not been known north of Connecticut. Like *P. hybridus* itself, it inhabits, apparently, shallow, quiet water. In Learned's Pond, South Framingham, Massachusetts, it occurs in an unusual way,— in *deep* water. Although for years I have been constantly on this pond, I had known no *Potamogeton* to occur there. But in September, 1909, I observed long stems of some water plant reaching up from deep water toward the surface. Investigation showed many plants of *P. hybridus*, var. *multi-denticulatus* growing in twelve to eighteen feet of water.